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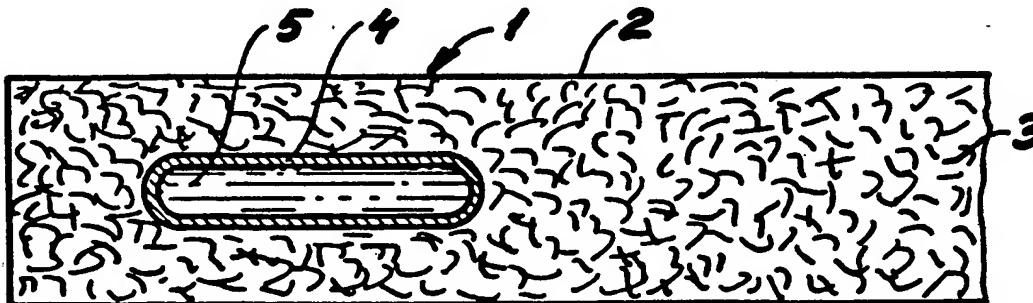
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A. Borschke

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(54) Title: SELF-EXTINGUISHING CIGARETTE <div data-bbox="360 1325 1386 1625" data-label="Image">  </div> <div data-bbox="321 1793 521 1848" data-label="Text"> <p>OCT 15 1986</p> </div> (57) Abstract: <p>A self-extinguishing cigarette comprising a tubular outer wrapper surrounding a tobacco rod or column is provided with a non-collapsible elongated ampoule, which will break, soften, fuse or burn when exposed to heat, containing a non-inflammable liquid medium in a sufficient amount to extinguish the glow in the cigarette when liberated from the ampoule and arranged coaxially at the mouth end and within the body of the cigarette.</p>		

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Self-extinguishing cigarette

The invention relates to a self-extinguishing cigarette .

It is well-known that a discarded smouldering cigarette can be unpleasant and dangerous because the cigarette may continue to smoulder and burn after the smoking has been discontinued.

The unpleasant aspects consist primarily in bad smell and odour produced during the slow burning of the discarded cigarette. The dangerous aspects consist in different types of serious fire hazards. Smouldering cigarettes in ashtrays have caused numerous fires which have resulted in complete destruction of buildings, ships, etc., e.g. when ashtrays with still smouldering cigarettes have been emptied in containers containing inflammable materials; and smouldering cigarettes discarded on the ground have caused numerous large and devastating fires in forests and fields.

These inconveniences and hazards could be eliminated or at least minimized if it was possible to provide a reliable self-extinguishing cigarette, which in the present context is defined as a cigarette having the ability of extinguishing itself at the moment when the glow arrives at a predetermined position on its way towards the mouth end of the cigarette. A further advantage of a self-extinguishing cigarette consists in the possibility of arranging the extinguishing position at such a point that it is impossible to smoke the last part of the cigarette, which is acknowledged as being the most dangerous, seen from a medical point of view.

In GB patent specification no. 245,329 it has been proposed

pos d t pr vide a self-extinguishing cigarett comprising
an encircling band r bands located int rmediat its
ends and tr ated chemically or by c nstricti n, r both,
for the purpose of extinguishing the slow burning or
5 smouldering of the cigarette when the smoking thereof
is discontinued, whilst permitting the proper burning
of the cigarette when smoked in the usual way.

However, this solution cannot be considered satisfactory,
10 partly because of unreliability, partly because the
chemically treated bands will cause formation of unaccept-
able gases with bad or strange taste when exposed to
the glow during or after smoking.

15 Cigarette filters containing a single or a plurality
of collapsible capsule(s) or ampoule(s) filled with
water or other liquids are known, e.g. from US patent
specification no. 3,428,049 and DK patent specificati n
no. 125,566. The water or liquid contained in these
20 capsules or ampoules is released by applying a squeezing
pressure to the outer wrapper of the filter, thereby
breaking the collapsible capsule or ampoule. According
to this part of the known art, the purpose of releasing
the water or the liquid in the filter is to improve
25 the effect of the filter and if desired to augment or
supplement the flavour of the smoke.

The safe functioning of such filters is however endanger d
by untimely breaking of the collapsible capsules or
30 ampoules, e.g. during the production of the filter;
when the filters are arranged in the cigarettes; and
during packaging and transport of the cigarettes from
fact ry t us r.

35 The object f the pres nt inv ntion is t pr vid a
reliabl self- xtinguishing igarett , as defin d ab ve.

which does not exhibit any of the above mentioned drawbacks.

5 This is achieved according to the present invention by a self-extinguishing cigarette comprising a tubular outer wrapper surrounding a tobacco rod or column, which is characterized by comprising a non-collapsible elongated ampoule, which will break, soften, fuse or burn when exposed to heat, containing a non-inflammable liquid
10 medium in a sufficient amount to extinguish the glow in the cigarette when liberated from the ampoule and arranged coaxially at the mouth end and within the body of the cigarette.

15 During smoking of the cigarette according to the present invention the glow will move down towards the ampoule, which will break, either directly by the action of the heat of the glow or indirectly by a pressure increase in the liquid medium, thus causing release of the liquid
20 medium, preferably water or an aqueous solution, contained in the ampoule. The released water or liquid will then rapidly extinguish the glow, i.e. the cigarette, without any conscious action from the smoker being needed.

25 Since the non-collapsible construction of the ampoule ensures that it will not break when the cigarette is subjected to a normal squeezing pressure, i.e. a pressure less than what would destroy the cigarette in any case, there is no risk of untimely release of the water or
30 liquid contained in the ampoule.

The ampoule is preferentially formed from a material, which will fuse or soften by the action of heat from the glow, and which does not produce noxious gases or
35 any small irritant when exposed to heat. Polythylene and polypropylene are examples of such preferred materials.

Preferably the ampoul has a length of about 10-25 mm, an external diameter of about 1.5 - 4 mm and an internal diameter of about 0.5 - 3.5 mm. Such ampoules can easily be manufactured by spot sealing a corresponding tube
 5 filled with water or liquid.

If desired, the water or the liquid may be kept at a moderate pressure within the ampoule.

- 10 The water or the liquid contained in the ampoule may contain additives, such as surfactants or other useful components, e.g. components augmenting or supplementing the flavour of the smoke, such as menthol or lemon oil.
- 15 Regardless of the composition and nature of the liquid in the ampoule, it should be present in a sufficient amount to extinguish the glow in the cigarette. In case of water less than 0.03 ml will generally suffice.
- 20 According to a preferred embodiment of the invention the ampoule is formed with a first end wall facing the glow and an opposite second end wall facing the mouth end of the cigarette, said first end wall being thinner than said second end wall.
- 25 The cigarette according to the present invention may also be provided with a filter element facing the tobacco rod or column. In this case the ampoule may be embedded partly in the filter element, partly in the tobacco
 30 rod, or it may be entirely embedded in the tobacco rod.

In the drawings

fig. 1 is a longitudinal cross-sectional view of the
 35 embodiment of the cigarette according to the invention, without filter tip;

fig. 2 is a longitudinal cross-sectional view of another embodiment of the cigarette according to the invention, with filter tip; and

- 5 fig. 3 is a longitudinal cross-sectional view of a filter element containing an ampoule.

As shown in fig. 1 a cigarette 1 without filter comprises an outer wrapper 2 surrounding a tobacco rod or column 10 3 containing an ampoule 4 containing water 5 arranged at the mouth end of the cigarette.

The filter cigarette 1 shown in fig. 2 comprises an outer wrapper 2 surrounding a tobacco rod or column 15 3 facing a filter rod 6. In this case the ampoule 4 is embedded partly in the filter rod 6, partly in the tobacco rod 3.

If it is desired to provide a filter cigarette, which 20 will extinguish when the glow is further away from the filter, the ampoule may be embedded totally in the tobacco rod.

Fig. 3 shows a filter element 7 which may be used in 25 the manufacture of the cigarette shown in fig. 2. This filter element 7 comprises a filter rod 6 and an ampoule 4 partially embedded therein. The illustrated ampoule 4 is formed with a thin end wall 8 facing the glow and an opposite end wall 9 having normal thickness and facing 30 the mouth end of the filter.

P A T E N T C L A I M S

1. A self-extinguishing cigarette comprising a tubular
outer wrapper surrounding a tobacco rod or column,
5 c h a r a c t e r i z e d by comprising a non-collapsible
elongated ampoule, which will break, soften, fuse or
burn when exposed to heat, containing a non-inflammable
liquid medium in a sufficient amount to extinguish th
glow in the cigarette when liberated from the ampoule
10 and arranged coaxially at the mouth end and within th
body of the cigarette.

2. A self-extinguishing cigarette according to claim
1,
15 c h a r a c t e r i z e d in that the liquid medium
is water or an aqueous solution.

3. A self-extinguishing cigarette according to claims
1 - 2,
20 c h a r a c t e r i z e d in that the ampoule is shaped
with a first end wall facing the glow and an opposite
second end wall facing the mouth end of the cigarette,
said first end wall being thinner than said second end
wall.

25 4. A self-extinguishing cigarette according to claims
1 - 3,
c h a r a c t e r i z e d in that the ampoule has a
length of about 10 - 25 mm, an external diameter of
30 about 1.5 - 4 mm, and an internal diameter of about
0.5 - 3.5 mm.

5. A self-extinguishing cigarette according to claims
1 - 4,
35 c h a r a c t e r i z e d in that the ampoule is formed
of a plastic material which will soften, fuse or burn

when exposed to heat without liberating noxious or smelly gases.

6. A self-extinguishing cigarette according to claim 5,
5 characterized in that said plastic material is polyethylene or polypropylene.

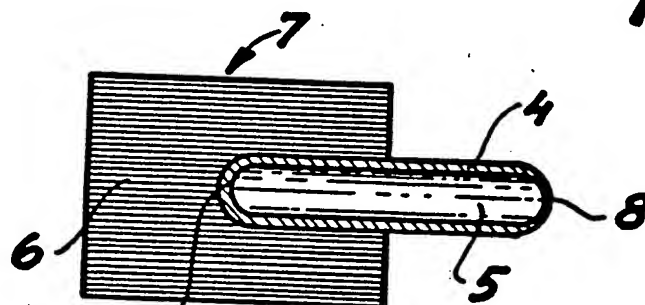
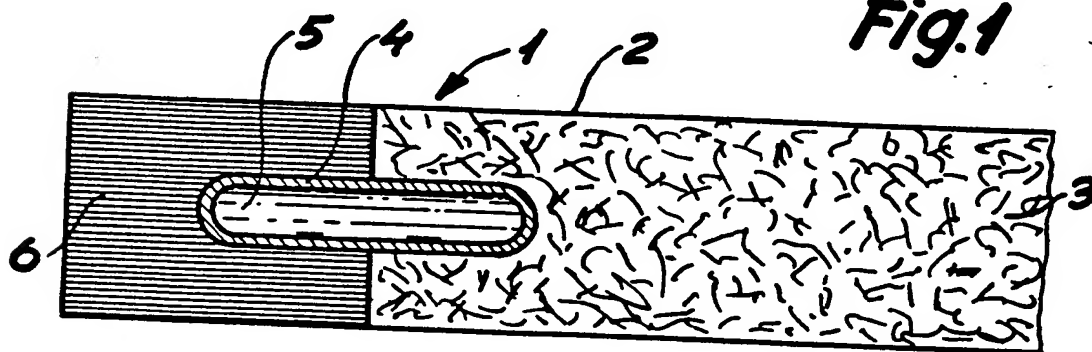
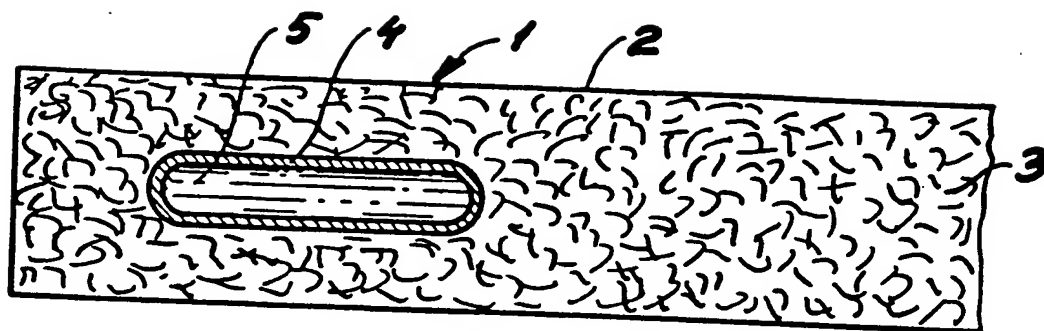
7. A self-extinguishing cigarette according to claims
1 - 6,
10 characterized in that said cigarette is provided with a filter element facing the tobacco rod or column and that the ampoule is embedded partly in the filter element, partly in the tobacco rod.

15 8. A self-extinguishing cigarette according to claims 1 - 6,
characterized in that said cigarette is provided with a filter element facing the tobacco rod or column and that the ampoule is entirely embedded
20 in the tobacco rod.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK86/00013

I. CLASSIFICATION F SUBJECT MATTER (If several classification symbols apply, indicate all) * According to International Patent Classification (IPC) or to both National Classification and IPC 4 <div style="margin-top: 5px; font-family: monospace; font-size: 1.2em;">A 24 D 1/10</div>																							
II. FIELDS SEARCHED <div style="text-align: center; margin-top: 5px;">Minimum Documentation Searched 7</div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 30%;">Classification System</th> <th style="width: 70%;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">IPC 2</td> <td style="padding: 5px;">A 24 C 5/50</td> </tr> <tr> <td style="padding: 5px;">IPC 4</td> <td style="padding: 5px;">A 24 D 1/00, /06, /10</td> </tr> <tr> <td style="padding: 5px;">US Cl</td> <td style="padding: 5px;">131:4, 349, 360-363</td> </tr> </table> <div style="text-align: center; margin-top: 5px; font-size: 0.8em;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *</div> <div style="text-align: center; margin-top: 10px; font-family: monospace; font-size: 1.2em;">SE, NO, DK, FI classes as above</div>			Classification System	Classification Symbols	IPC 2	A 24 C 5/50	IPC 4	A 24 D 1/00, /06, /10	US Cl	131:4, 349, 360-363													
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III. DOCUMENTS CONSIDERED TO BE RELEVANT * <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Category *</th> <th style="width: 70%;">Citation of Document, ** with indication, where appropriate, of the relevant passages 12</th> <th style="width: 20%;">Relevant to Claim No. 13</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top;">X, Y</td> <td style="padding: 5px;">US, A, 3 985 143 (JAMES B LAPPIN JR) 12 October 1976</td> <td style="text-align: center; vertical-align: top;">1-8</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td style="padding: 5px;">US, A, 1 726 737 (E M HARRIS) 30 December 1927</td> <td style="text-align: center; vertical-align: top;">1-8</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="padding: 5px;">US, A, 4 436 101 (WILLIAM SEATTS) 13 March 1984</td> <td style="text-align: center; vertical-align: top;">1-8</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="padding: 5px;">US, A, 4 226 249 (MARION A NEWMAN) 7 October 1980</td> <td style="text-align: center; vertical-align: top;">1-8</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="padding: 5px;">DK, B, 125 566 (THE H-2-0 FILTER CORPORATION, NEW YORK, USA) 12 March 1973</td> <td style="text-align: center; vertical-align: top;">1-8</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="padding: 5px;">DK, B, 115 903 (THE H-2-0 FILTER CORPORATION, NEW YORK, USA) 17 November 1969</td> <td style="text-align: center; vertical-align: top;">1-8</td> </tr> </tbody> </table>			Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 13	X, Y	US, A, 3 985 143 (JAMES B LAPPIN JR) 12 October 1976	1-8	X	US, A, 1 726 737 (E M HARRIS) 30 December 1927	1-8	Y	US, A, 4 436 101 (WILLIAM SEATTS) 13 March 1984	1-8	Y	US, A, 4 226 249 (MARION A NEWMAN) 7 October 1980	1-8	Y	DK, B, 125 566 (THE H-2-0 FILTER CORPORATION, NEW YORK, USA) 12 March 1973	1-8	Y	DK, B, 115 903 (THE H-2-0 FILTER CORPORATION, NEW YORK, USA) 17 November 1969	1-8
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>																							
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search <div style="margin-top: 5px; font-family: monospace; font-size: 1.2em;">1986-04-21</div> </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report <div style="margin-top: 5px; font-family: monospace; font-size: 1.2em;">1986-05-13</div> </td> </tr> <tr> <td style="width: 50%; padding: 5px;"> International Searching Authority <div style="margin-top: 5px; font-family: monospace; font-size: 1.2em;">Swedish Patent Office</div> </td> <td style="width: 50%; padding: 5px;"> Signature of Authorized Officer <div style="margin-top: 5px;"> Yvonne Sjösteen </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="margin-top: 5px; font-family: monospace; font-size: 1.2em;">1986-04-21</div>	Date of Mailing of this International Search Report <div style="margin-top: 5px; font-family: monospace; font-size: 1.2em;">1986-05-13</div>	International Searching Authority <div style="margin-top: 5px; font-family: monospace; font-size: 1.2em;">Swedish Patent Office</div>	Signature of Authorized Officer <div style="margin-top: 5px;"> Yvonne Sjösteen </div>																	
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